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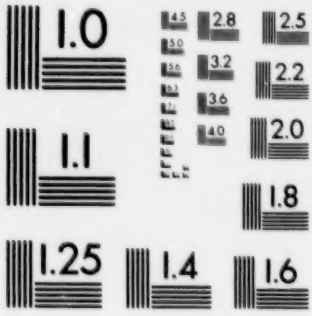

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TITLE "EVALUATION OF THE BASS RIVER NOVA SCOTIA MAGNETITE DEPOSIT (geological description)"

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GEOLOGICAL D[illegible]

OF

THE BASS RIVER MAGNETITE PROJECT

BY

A.M. BARRETT

MARCH, 1988

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MICROMEDIA

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INTRODUCTION

This report attempts to describe the geology and potential of the Bass River Magnetite deposit, which is contained in Exploration Licenses 11521 and 11133, and are shown on the following location map (Figure 1).

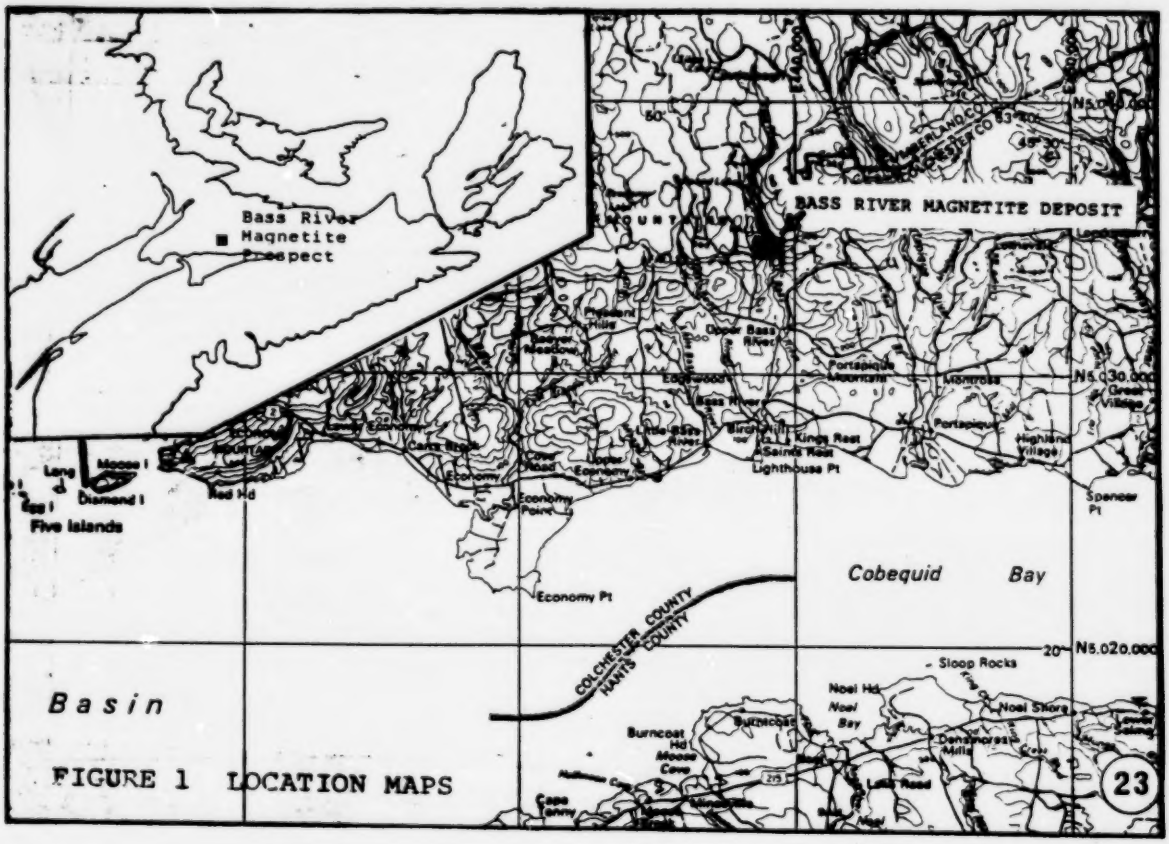


FIGURE 1 LOCATION MAPS

A discussion on exploration programs is included to provide detailed background on how geological and resource interpretations were derived. Assays and site plans are contained in a separate report prepared by Jacques Whitford.

BACKGROUND

The prospect was identified by A.M. Barrett in 1985 by reviewing the records at the Department of Mines and Energy with part of the target area being acquired in early 1986. Samples were taken from outcrops and old trenches. These were assayed and found to be very rich in magnetite and sulphides including anomalous cobalt values.

Process research was undertaken using the facilities at the Technical University of Nova Scotia. It was determined that the ore could be readily processed using simple magnetitic separation. Markets for iron oxides and particularly specialty magnetite were then reviewed and market opportunities were identified as heavy media for coal preparation. Strong customer interest was displayed for product of the specifications that can be obtained from the prospect.

A detailed magnetometer survey and mapping program were undertaken with an extraordinary magnetic anomaly of +25,000 gammas being present in the claims group with apparent extensions to the east. The mapping program which included surveying of claims boundaries confirmed the extension.

The property to the east was optioned from Magstone Ltd. and additional surveys were conducted showing an anomalous zone

about 500 feet in length by 125 feet in width. Trenching was then undertaken across the anomaly with sampling and mapping being done by Jacques, Whitford and Associates. The sample showed a very strong correlation with magnetometer readings and ore grades over mineable widths.

Data from the various programs was then synthesized to develop economic models to determine if adequate potential was displayed to warrant additional expenditures. Financial analysis was undertaken using various assumptions on grade and ore body geometry. Potential profitability was indicated as long as grades are in access of 30% magnetite and strip ratios are less than 3:1 waste to ore. As evidence to date suggests that both criteria are met, further work to assess the feasibility of the project was warranted.

A core drilling program of 6 holes, totalling 1000 feet, was then conducted using the services of Maritime Drilling Ltd with the logging and sampling done by Jacques Whitford. Five holes intersected magnetite rich zones, grading 35% magnetite, across apparent thickness of 100 feet - 110 feet.

Additional trenching using a tracked backhoe was then undertaken to confirm extensions to the surface as indicated by previous trenching and magnetic surveys. This program again demonstrated strong correlation between magnetic signatures and

trench samples except on the north side of the deposit indicating a southerly dipping structure.

Process tests were then conducted by the Minerals Engineering Center which indicated that the ore could be readily processed by magnetite separation. The Cape Breton Development Corporation subsequently agreed to undertake bulk testing of the product to confirm its suitability as heavy media.

Currently the project is awaiting regulatory approval to extract a bulk sample.

DEPOSIT DESCRIPTION

A. Introduction

This chapter describes the prospect in terms of its history, general geology, local geology and structure, topography, infrastructure, climate and vegetation.

B. History

The presence of magnetite on the property was first discovered by local prospectors in the 1930's. Trenching was undertaken with many small test pits being sunk in the mineralized zone and country rock. There were no reported results from this work even though ore grades were apparently encountered. High sulphur content likely discouraged any further effort.

MacPhar Geophysics conducted a dip-needle magnetometer survey in 1951, outlining a zone some 1,400 feet long and up to 200 feet wide which was thought to contain up to 3,000,000 tons of ore grading approximately 40% iron but with up to 10% sulphides. The sulphur content was too high for use in steel production and so the property was dropped.

C. General Geology

The claim groups are underlain on the north by volcanics and metasediments of the Cobequid Mountains Massif. These ancient rocks are separated from the Carboniferous sediments on the southern portions of the property by the Cobequid fault and the Londonderry fault (Figure 2).

There are a series of magnetite occurrences between Bass River Falls and the Economy River as evidenced by pronounced aeromagnetic anomalies shown in Figure 3. Four such occurrences have been located through prospecting and ground magnetic surveys. The mineralization consists of magnetite and sulphides as fracture-fill in metasediments, and all are very similar to that of the Bass River Deposit.

The magnetic anomalies and magnetite occurrences are located on or within 100 meters of the Cobequid-Londonderry fault scarp. This spatial relationship and common mineralogy indicates that the occurrences are all related to fault movements.

The district is part of an iron rich zone which extends from Five Islands to Folly River. Various forms and ages of iron mineralization are present with magnetite being the most common mineral west of Bass River and hematite, ankerite, siderite,and

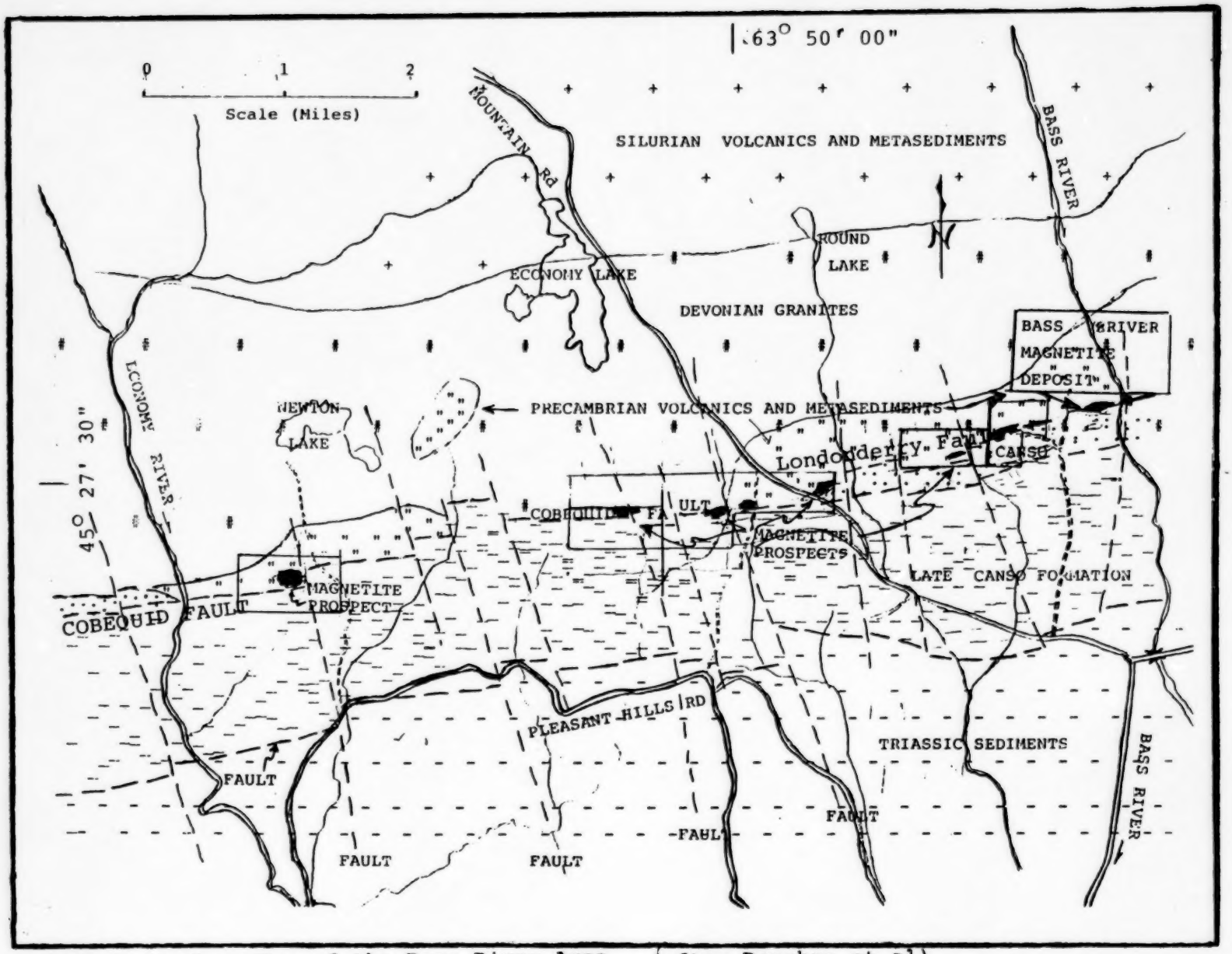
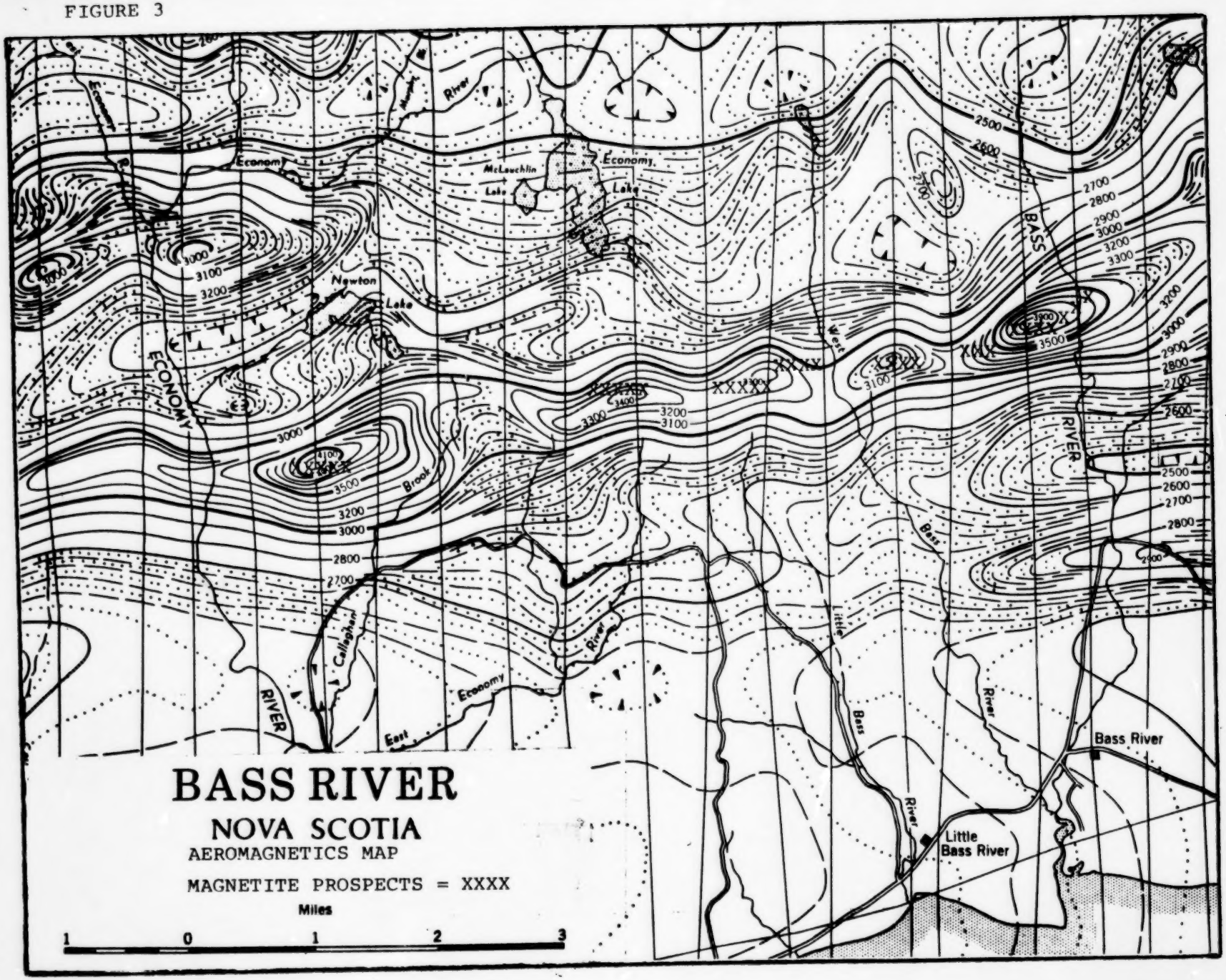


FIGURE 2 Geology Map of the Bass River Area (after Donahue et al)

FIGURE 3


BASS RIVER
NOVA SCOTIA
AEROMAGNETICS MAP
MAGNETITE PROSPECTS = XXXX
Miles
1 0 1 2 3
Economy
McLauchlin Lake
Newton Lake
ECONOMY RIVER
Callaghan Brook
East Economy River
BASS RIVER
West Bass River
Little Bass River
Bass River
Bass River
Little Bass River

limonite being common iron minerals in the eastern portion of the district. The relationship of the magnetite occurrences to other iron mineral occurrences has not been established. However, repeated reactivation of the Cobequid fault system may have played a controlling role in the genesis of each.

D. Local Geology

These occurrences are found along the faulted contact between metasediments and carboniferous sediments.

Magnetic signatures indicate that the fault zone is slightly enriched in magnetite for 3000 feet westward from Bass River with pronounced enrichment in two small pods and in the Bass River deposit.

The pod in the Bass River gorge is exposed across its width of about 70 feet. The southern boundary is composed of metamorphosed limestone with minor stringers of magnetite zone of brecciated metasediments. A zone, rich in magnetite, calcite and sulphides, extends for about 15 feet followed by a zone of very fine grained metasediments decreasing in magnetite content towards the north contact. The north contact is welded to, and virtually indistinguishable from the metasediments.

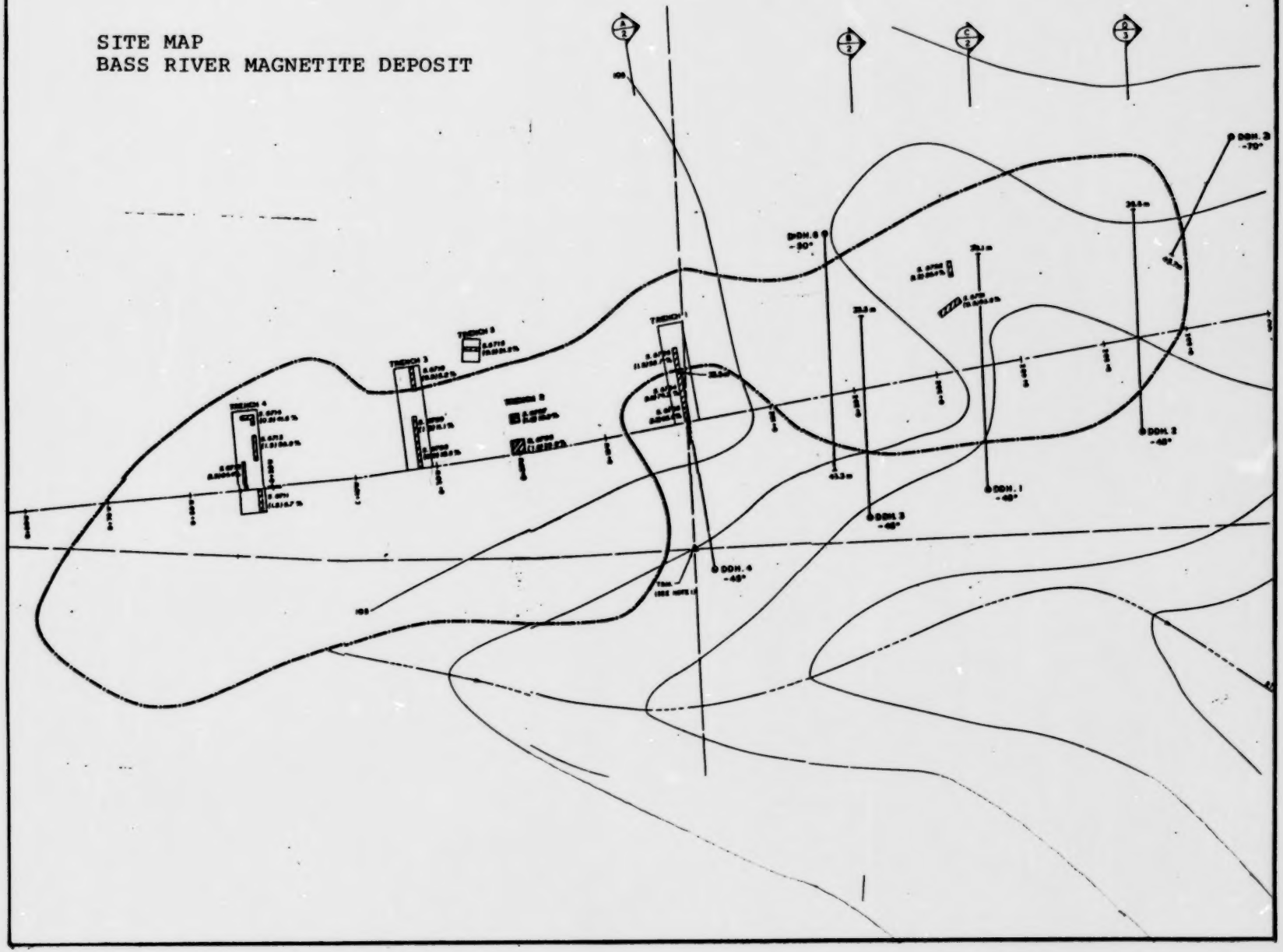
E. Deposit Geology

The Bass River deposit occurs about 1000 feet west of Bass River Falls. The deposit outline is shown on the attached map which also shows magnetic signatures and locations for drill holes, trenches and outcrops.

The deposit consists of cryptocrystalline magnetite (10-80%) with iron sulfides (3-6%); which are rich in cobalt and hematite (3-10%). Magnetite is found filling fractures and as cement in brecciated siliceous metasediments and as replacement of metasediments. The footwall consists of banded fine grained metasediments containing stringers of magnetite in fractures. The hanging wall is a calcite unit. The metamorphism of the wall rock is not intense, being approximately chlorite grade, with no apparent recrystallization of metamorphic mineral assemblages. The deposit is cut by large calcite veins generally following the strike of the deposit. These veins post date the iron mineralization.

The deposit is a tabular pipe-like structure which dips southward at about 50° and may rake south-southeast at a high angle. The surface expression, based on drill collars, trenches and outcrop is approximately 180 meters along strike and 40 meters wide. The true thickness of the deposit is estimated to be 28-32 meters assuming a dip angle of $50_{\circ}$ - $60_{\circ}$.

SITE MAP
BASS RIVER MAGNETITE DEPOSIT



The age of the mineralization has not been determined as emplacement could have ocurred during any of several reactivations of the Cobequid fault systems. Carboniferous or post-Carboniferous age is postulated. The deposit appears to have been derived from hydrothermal solutions migrating upwards along the Londonderry-Cobequid fault. These solutions were apparently depleted in oxygen relative to iron and sulfur values. Mineral precipitation appears to have resulted from rapid changes in temperature and pressure. The channel ways carrying the mineralizing solutions appear to have been sealed at depth while dilations continued to form. These dilations were filled with more locally derived calcite which may have served to quench residual heat in the formation.

An alternative geological scenario is that the magnetite pipes are Kiruna-type injection systems. However, there appears to be replacement mineralization as well as fracture filling which is more likely to indicate hydrothermal emplacement.

The emplacement of the iron mineralization is, without question, due to secondary features on the Londonderry-Cobequid fault complex. In this instance, the mineralization occurs on a dilation system in the fault zone of the Londonderry normal fault. Several structural models have been considered as the cause of the dilation systems. Two interpretations are most supportable. They are;

1) Slight transverse or thrust movement on the Londonderry fault post formation of the graben. Graben fault planes typically form wavy tension patterns with the core of the wave following the direction of movement. Subsequent compressional movement would offset these irregularities resulting in channel ways for mineralizing solutions.

2) Cross cutting faults intersecting graben structures which created irregularities in the fault plane. Such irregularities would follow the intersection line of the fault planes.

There is minimal evidence to support or refute either theory except that cross-cutting faults were cut in drill hole number 5. Also, cross-cutting faults have been mapped at this and two other occurrences. The aeromagnetics signature is also consistent with cross-cutting faults.

EXPLORATION PROGRAMS

A. Introduction

This chapter describes the methodology and results of the exploration program conducted since 1986. The work included:

- field mapping
- magnetic surveys
- trenching
- drilling
- sampling and assaying

B. Field Mapping

The mapping program consisted of line cutting, surveying and reconnaissance geology in the immediate vicinity around the prospect. Regional reconnaissance programs were also conducted.

The survey program included positioning of the prospect relative to claims boundaries, positioning the baseline and determining relative elevations with a hand level.

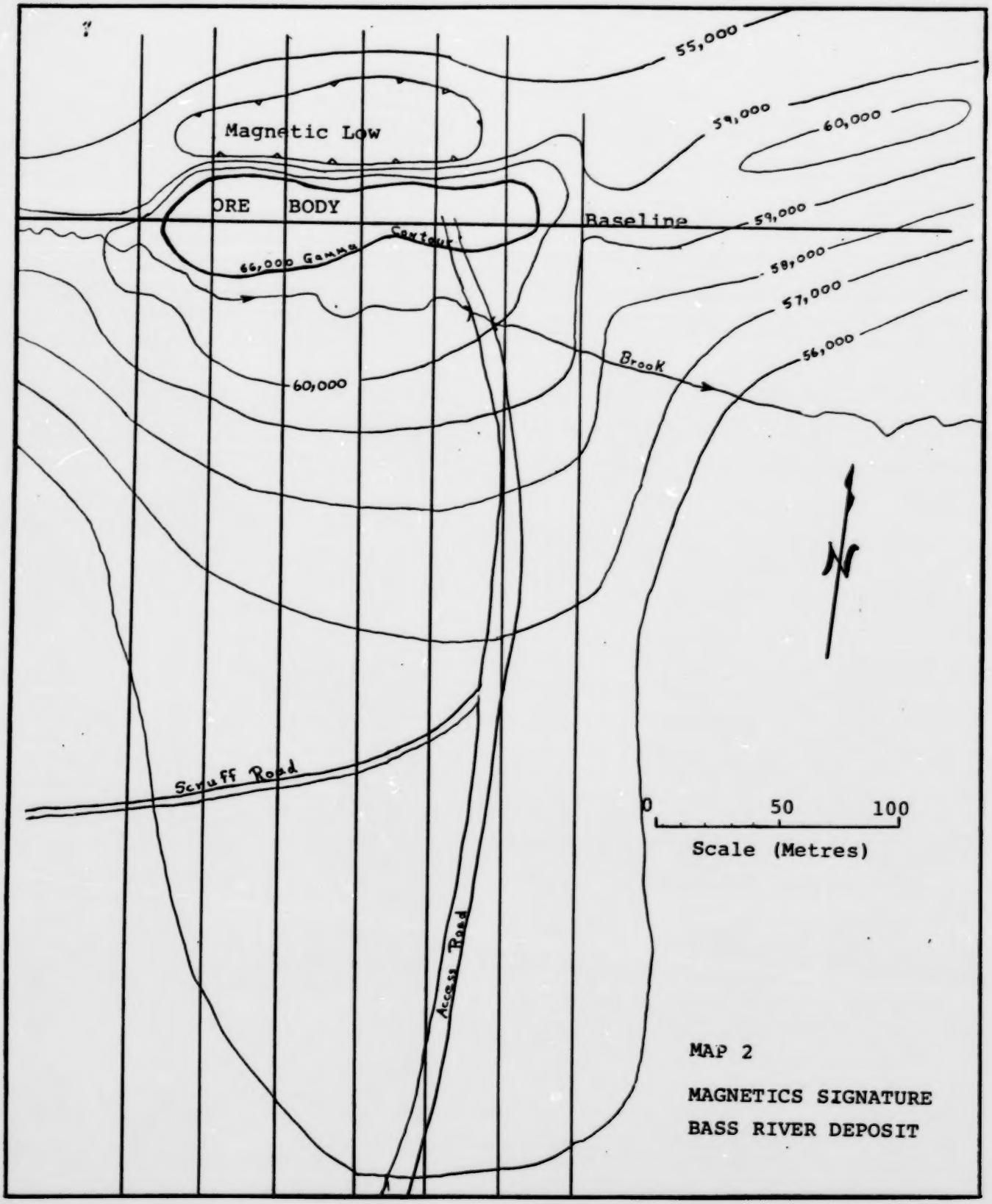
Line cutting included establishing a base line along the strike of the prospect from its western end to Bass River and blazing and flagging cross lines on a 50 foot grid.

Field mapping was conducted relative to the grid system tying in all observed geological and topographic features. Iron mineralization was traced in outcrop, float trains and trenches along a ridge formed by differential erosion which extended to the outcrop in Bass River from the fault terminated western extremity of the prospect.

The outcrop sequence in the Bass River gorge shows that the iron formation is welded to the Precambrian volcanics and metasediments with faulting in evidence at the contact with Carboniferous sediments. Several hundred feet south of that contact, there is strong evidence that the Windsor is in fault contact with Canso sediments. At the prospect, this sliver of Windsor sediments is only several feet thick, as the faults apparently merge just west of the deposit.

C. Magnetometer Surveys

Four detailed magnetometer surveys were undertaken on the property. The two initial surveys were designed to locate and delineate the extent of magnetite mineralization. The third survey, conducted by Jacques Whitford, was conducted to confirm the results of the preceding surveys. The fourth survey was conducted to determine if mineralization continued down dip. In each case, the results of the preliminary program were confirmed. Map 2 shows the results of the fourth magnetometer

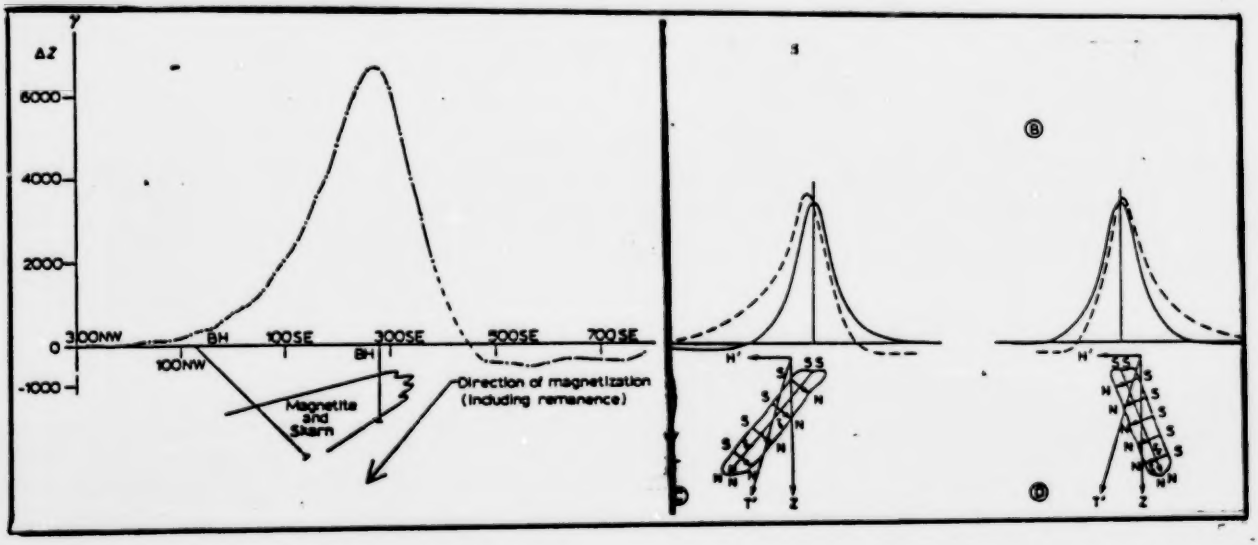


MAP 2

MAGNETICS SIGNATURE
BASS RIVER DEPOSIT

survey conducted by D. Smeltzer, October, 1987.

The magnetic signature shown in Map 2 is consistent with tabular pipe structure dipping south and raking slightly east as magnetic depressions occur north of the ore zone and, to a lesser degree, along its western extremity. Note that the anomaly does not abruptly terminate southward but rather fades slowly to background some 300 meters south of the deposit. This signature is very similar to theoretical signatures for dipping tabular features as per the following figures.



Magnetic Profile Kiruna Deposit

Theorectical Magnetic Profile for a dipping structure

The magnetic signature is interpreted to indicate structural continuity to depth suggesting substantial tonnage potential.

D. Trenching

Trench locations and assays are shown in Map 1 (attached). The program was hampered by terrain factors such that contacts were not always encountered. Note that assays correlated strongly with magnetic signatures except on the north side of the deposit where the effects of transverse magnetism came into play causing a depression in spite of high (50%) magnetite content. This effect initially caused confusion in interpreting the structure of this and our other deposit. Note also that the surface grades are overstated due to the effects of leaching and assays problems as discussed below.

E. Drill Program

The objectives of this program were; a) to delineate adequate reserves to supply local markets for 10 years; b) to gain geological information to interpret the structure and; c) to obtain representative samples for metallurgical testing. All of these objectives were met.

Six holes totalling about 1000 feet were cored on the eastern end of the deposit in March and April of 1987, as shown on the attached map. The first four holes were collared in calcite which is now considered to be included in the ore zone. Holes 1-3 intersected 28-34 meters in which intensely brecciated

metasediments are recemented by magnetite with extensive calcite veining. In each of these holes the magnetite grades were somewhat variable across the section but there are consistent patterns to magnetite and calcite distribution. The zoning sequence is as follows:

Hanging wall -

- calcite
- 20-35% magnetite 5-10 meters
- 8-20% magnetite next 5-10 meters
- 45-75% magnetite next 5-10 meters
- calcite across 1 meter
- less than 10% magnetic across 1 meter
- banded metasediments.

Footwall -

Hole number 4 showed similar mineral distribution patterns but magnetite content is lower on average. Hole number 6 was positioned on the assumptions that; a) the ore zone was vertical and; b) that the magnetic signature at 65,000 gammas delineated the back side of the ore zone. Hence, the hole was started in the middle of the ore zone and, more or less followed the ore zone down dip. This hole was intended to cross the section from north to south. However, the hole appears to have bottomed in the foot-wall. Hole No. 5 followed the structure downdip and only intersected minor mineralization where faults offset the zone.

F. Assaying

Developing an assay technique to determine magnetite content of rock samples and drill core has proven to be a major problem area. Chemical assays do not work because hematite, iron sulphides and other non magnetic iron oxides are present. Conversion of iron values to magnetite values somewhat overstated the proportion of magnetite present.

A method was devised by T.U.N.S. to measure magnetite content directly. For as yet unexplained reasons, the method, which is theoretically sound, significantly overstated initial surface samples and significantly understated drill core results. These deviations, which were as much as 30%, were cross checked using magnetic separation and are considered to be confirmed.

Very recent tests conducted by DEVCO indicate that the magnetite susceptibility is 5 to 10% lower than that magnetite of their current supplier. It is postulated that this variance played a role in the failure of the system. It is also postulated that the magnetic susceptibility is variable for different areas in the deposit further complicating the assay situation.

The samples from the trenching programs in the eastern portion of the property are also generally overstated due to

enrichment by leaching of calcite and sulphides. The actual grades of the deposit were estimated accurately using magnetic separation and then confirming the results through wet chemical assays, specific gravity determinations and magnetics tests. Two samples were taken per drill hole being approximately 50 feet per sample. The tests confirmed that the lower grade sections averaged 25% magnetite and the high grade sections averaged 40% magnetite. The weighted average is 35% magnetite across the drilled section.

The assays shown on maps and cross sections are as reported by T.U.N.S. These assays overstate surface assays and understate drill hole results giving the appearance that the grade is decreasing at depth. This is not the case. The drill assays only were utilized to calculate tonnage and grade.

The drill hole assays were used to calculate tonnage as the assays were deemed to err on the side of caution. Surface assays were not utilized except to correlate magnetite signatures and mineralization patterns and to direct the drilling.

G. Topography

The mineralized zone occurs on the north flank of a gully having about 100 feet of vertical relief. It is also flanked on its north side by a gully having about 30 feet of relief. A

small demi-cylinder roll in the topography results which should make quarrying simple.

The topography generally is somewhat hilly and irregular with a deep gorge (+250 feet) to the east. The prospect is on the flank of the Cobequid fault scarp and occurs at an elevation of about 500 feet with moderate sloping towards the Bay of Fundy.

H. Infrastructure

A class B woods road passes about 1,200 feet west of the prospect and a haulage road could be connected to this road by following the land contours for about 1,600 feet to the southeast. The woods road joins the highway at Upper Bass River, a distance of 3.5 miles.

Industrial power is available at Bass River village about 4 miles from the prospect. The nearest port is Parrsboro which is 30 miles west of the prospect. There are haulage limits on the Parrsboro-Truro highway of 27 tonnes.

I. Climate

The climate is temperate but with very heavy snowfall in winter. Quarrying could only be conducted from May to November.

J. Vegetation

The site is heavily wooded with large hardwoods.

CONCLUSIONS

The exploration programs, though incomplete, indicated that a significant tonnage of mineralization occurs within the claim group. The mineralized zone which apparent dimensions of 30 meters by 180 meters probably contains in excess of 500,000 tonnes per every 30 meters of depth along the dip with variable grade from 10 to 80% magnetite and up to 93% iron minerals. All evidence suggests a large reserve is present. What can be considered a proven resource, however, has not truly been quantified. Economic factors combined with uncertainties about product characteristics may limit what can actually be mined. Additional exploration is required, particularly more drilling. However, more detailed process research and market testing should take precedence over exploration, except perhaps large scale trenching.